

# **2021 Online HYSPLIT Workshop (DAY 3 of 4) Wrap-Up**

NOAA Air Resources Laboratory  
June 15-18, 2021

Workshop guidance and resources posted at

[Workshop Web Page](#)

`https://www.ready.noaa.gov/  
register/HYSPLIT\_hyagenda.php`

... this wrap-up presentation will  
be put on Workshop Web Page

# Agenda – Day 1

UTC	EDT	Agenda Item
13:00 – 13:15	09:00 – 09:15	Welcome, Introduction and Logistics
13:15 – 14:00	09:15 – 10:00	1. Installing HYSPLIT
14:00 – 14:10	10:00 – 10:10	Break
14:10 – 14:50	10:10 – 10:50	2. Testing the installation
14:50 – 15:00	10:50 – 11:00	Break
15:00 – 15:45	11:00 – 11:45	3. Gridded meteorological data sets
15:45 – 16:30	11:45 – 12:30	Break
16:30 – 18:00	12:30 – 14:00	4. Trajectory calculations
18:00 – 18:15	14:00 – 14:15	Break
18:15 – 19:30	14:15 – 15:30	5. Trajectory options
19:30 – 19:40	15:30 – 15:40	Break
19:40 – 20:45	15:40 – 16:45	6. Trajectory statistics
20:45 – 21:00	16:45 – 17:00	First day wrap-up

# Agenda – Day 2

UTC	EDT	Agenda Item
13:00 – 13:15	09:00 – 09:15	Comments / questions from previous day
13:15 – 14:45	09:15 – 10:45	7. Air Concentration Calculations
14:45 – 15:00	10:45 – 11:00	Break
15:00 – 16:30	11:00 – 12:30	8. Configuring the CAPTEX simulation
16:30 – 17:30	12:30 – 13:30	Break
17:30 – 19:00	13:30 – 15:00	9. Air Concentration Parameter Sensitivity
19:00 – 19:15	15:00 – 15:15	Break
19:15 – 20:00	15:15 – 16:00	10. Alternate Display Options
20:00 – 20:45	16:00 – 16:45	11. Pollutant Transformations and deposition (started this section)
20:45 – 21:00	16:45 – 17:00	Second day wrap-up / questions

# Agenda – Day 3

UTC	EDT	Agenda Item
13:00 – 13:15	09:00 – 09:15	Comments / questions from previous day
13:15 – 14:15	09:15 – 10:15	11. Pollutant Transformations and deposition <i>(...continued from Day 2)</i>
14:15 – 14:30	10:15 – 10:30	Break
14:30 – 16:00	10:30 – 12:00	12. Air Concentration Uncertainty
16:00 – 17:00	12:00 – 13:00	Break
17:00 – 18:00	13:00 – 14:00	13. Source Attribution Methods
18:00 – 18:15	14:00 – 14:15	Break
18:15 – 19:15	14:15 – 15:15	13. Source Attribution Methods <i>(continued)</i>
19:15 – 19:30	15:15 – 15:30	Break
19:30 – 20:45	15:30 – 16:45	14. Wildfire Smoke and Dust Storms
20:45 – 21:00	16:45 – 17:00	Third day wrap-up / questions

# Agenda – Day 4

UTC	EDT	Agenda Item
13:00 – 13:15	09:00 – 09:15	Comments / questions from previous day
13:15 – 14:45	09:15 – 10:45	15. Radioactive Pollutants and Dose
14:45 – 15:00	10:45 – 11:00	Break
15:00 – 16:30	11:00 – 12:30	16. Volcanic Eruptions with Gravitational Settling
16:30 – 17:30	12:30 – 13:30	Break
17:30 – 18:30	13:30 – 14:30	17. Custom Simulations
18:30 – 18:45	14:30 – 14:45	Break
18:45 – 19:45	14:45 – 15:45	Questions and answer (Q & A) session with course instructor Roland Draxler
19:45 – 20:00	15:45 – 16:00	Final course wrap-up

# Recordings

# Recordings

Access recordings from the Workshop Web Page:  
[https://www.ready.noaa.gov/register/HYSPLIT\\_hyagenda.php](https://www.ready.noaa.gov/register/HYSPLIT_hyagenda.php)

- ❑ Recordings of each day's on-line sessions are being created, *but processing typically takes at least 2-4 hours* -- once the video is posted on our site, the corresponding item in the list below will turn into a link you can click to view

**Handouts, Notes, and Recordings.** Videos of each day's on-line sessions are being created for review by participants, e.g., for those in time zones that would make online participation difficult. Processing of the videos to make them viewable takes significant time. When the video is posted, the corresponding entry below will become a link. When you click on one of these links, you should be able to view the video directly. To download a video recording, start playing it. Then place your mouse anywhere in the video area and right click the mouse. Choose the "Save As" menu.

▶ **Day 1 (Tue, June 15)**

▶ [Workshop day 1 introduction](#)

▶ [Workshop video recording day 1](#) (See the above paragraph on how to download the video file.)

▶ [Workshop day 1 wrap-up](#)

▶ **Day 2 (Wed, June 16)**

▶ [Workshop day 2 introduction](#)

▶ [Workshop video recording day 2](#)

▶ Workshop day 2 wrap-up (pdf, 2.3 MB; pptx, 85 MB) - The PPTX version contains the video of a pressurized balloon and it is much bigger. The balloon launch video may be downloaded from [this link](#) (mp4, 82 MB).

▶ **Day 3 (Thr, June 17)**

▶ [Workshop day 3 introduction](#). Additional materials: [HYSPLIT Simulations for ALOHA Chemicals: Possibilities and Suggestions](#) (pdf, 2.1 MB), [HYSPLIT Simulation Parameters for ALOHA Chemicals](#) (pdf, 7.6 MB).

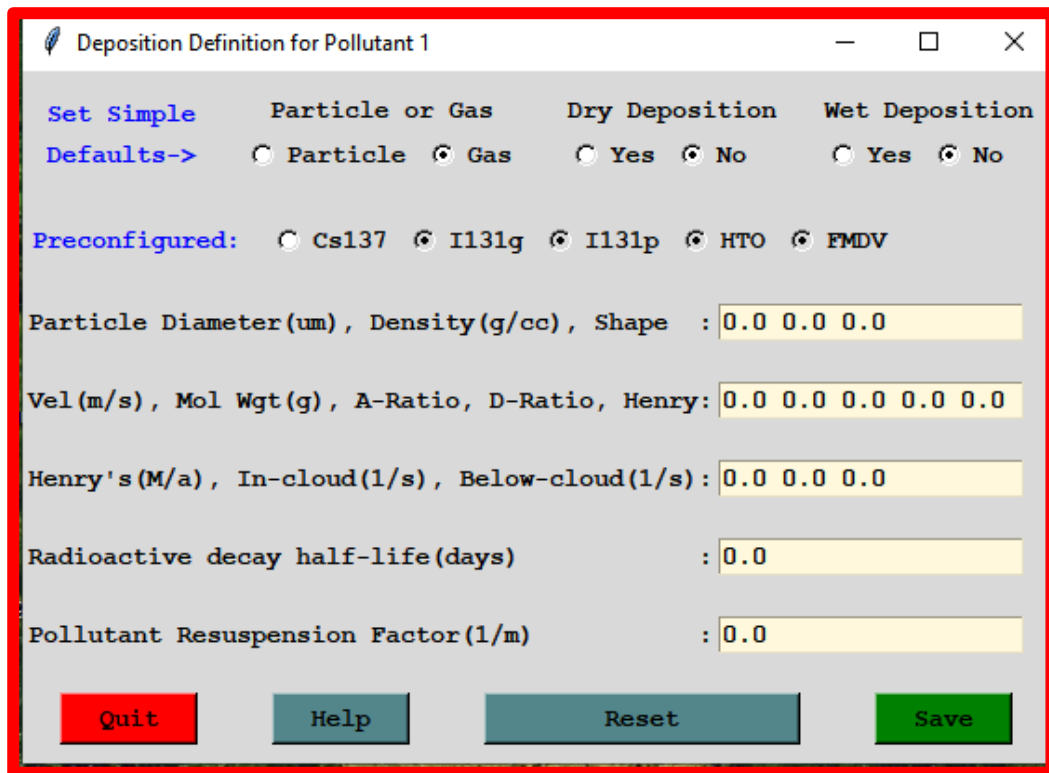
▶ Workshop video recording day 3 (Not available yet)

▶ **Day 4 (Fri, June 18)**

▶ Workshop video recording day 4 (Not available yet)

# Tips, Tricks, and some Key Questions

# Buttons at the top of the Deposition Definition Menu



Deposition Definition for Pollutant 1

Set Simple Defaults-> Particle or Gas Dry Deposition Wet Deposition

☐ Particle ☒ Gas ☐ Yes ☒ No ☐ Yes ☒ No

Preconfigured: ☐ Cs137 ☒ I131g ☒ I131p ☐ HTO ☐ FMDV

Particle Diameter(um), Density(g/cc), Shape : 0.0 0.0 0.0

Vel(m/s), Mol Wgt(g), A-Ratio, D-Ratio, Henry: 0.0 0.0 0.0 0.0 0.0

Henry's(M/a), In-cloud(1/s), Below-cloud(1/s): 0.0 0.0 0.0

Radioactive decay half-life(days) : 0.0

Pollutant Resuspension Factor(1/m) : 0.0

Quit Help Reset Save

- The particle vs. gas buttons and dry vs. wet buttons at the top of the deposition menu just pre-populate some of the fields below with values that might be typical.
- It can give you a hint about what values you need to consider.
- But, anything you do further in the menu will over-ride anything you did at first by pressing any of those buttons at the top.
- When HYSPLIT does the run, it doesn't look for whether the top-level buttons are pushed, but only for the values set in the menu below the button.

- ❑ **HYSPLIT mass and concentration units**
  - Tied to whatever you "mean" when you put in the emissions rate.
  - If set emit rate of 2 per hour and you mean 2 kg per hour, then output concentration units are kg/m<sup>3</sup>, and output deposition units are kg/m<sup>2</sup>
  - If set emit rate of 2 per hour and you mean 2 grams per hour, then output concentration units are in g/m<sup>3</sup>, and output deposition units are g/m<sup>2</sup>
  - In the graphics and other menus, can adjust units (e.g., from grams to picograms by multiplying by 1.0E+12)
  
- ❑ All the files associated with the run you just did (or tried to do) are in your **hysplit/working directory** (e.g., CONTROL, SETUP.CFG, MESSAGE, output files, graphics...)
  - Examine CONTROL file in text editor – sometimes you will see an obvious error!
  
- ❑ Display > error > **concpplot.ps not found**, it probably means something happened in run and cdump file was not found or was not usable (e.g., all zeros, ...)
  
- ❑ **GUI menus have context sensitive HELP** (...takes you to relevant page of Users Guide...)
  
- ❑ On-line User's Guide at:  
<https://www.ready.noaa.gov/hysplitusersguide/>

- ❑ **Shortcut:** When Tutorial says save or retrieve a CONTROL or SETUP.CFG file, versions of those same files in: Tutorial > files (but will likely need to adjust directory location for met data file)
- ❑ if animation fails, you may not have convert.exe or HYSPLIT can't find it
  - When installing ImageMagick, must “install legacy utilities, e.g., convert.exe”
  - Advanced > Configuration Setup > Set Directories (can tell HYSPLIT where a key executable is)
- ❑ Can look at files size(s) of files in your Working directory. Sometimes this will give you a useful clue as to what happened. If a file is too big or too small, at least you know that something happened in producing that file...
- ❑ If get too far behind, or too frustrated trying to do your own modeling, and look and listen to Webinar at the same time, it is ok to view as Demo and go back and work through Tutorial on your own (or with recordings from this Workshop)

- ❑ You must have a concentration layer of 0 in order to get deposition output, even if deposition is included in simulation
- ❑ If computational particle (or puff) or a trajectory goes past end of met grid, it terminates
- ❑ Can have multiple met grids – HYSPLIT picks best grid for any given point in simulation
  - Finer grid near source (e.g., 3 km, 12 km, 27 km met data sets...)
  - Coarser grid for more remote (e.g., global 1 degree or even 2.5 deg)
- ❑ If your runs are going too slow, reduce particle number from Advanced menu.
  - You won't get the exact same answer, but the runs will go faster.
  - For the purposes of the Workshop, it will be fine in almost all cases to do this
- ❑ Can Search HYSPLIT Forum
  - Place + in front of a word that must be found e.g., MESSAGE +PERMISSION +DELETE
  - Place – in front of word that must not be found e.g., MESSAGE +PERMISSION +DELETE –IMAGEMAGICK
  - Use \* as wildcard for partial matches
  - Put words separated by | into brackets if only one needs to be found e.g., [CONTROL|SETUP.CFG] + RETRIEVE
- ❑ Can download met data for simulations on your computer from READY site

## Key Point – the model results can vary with different assumptions and inputs..

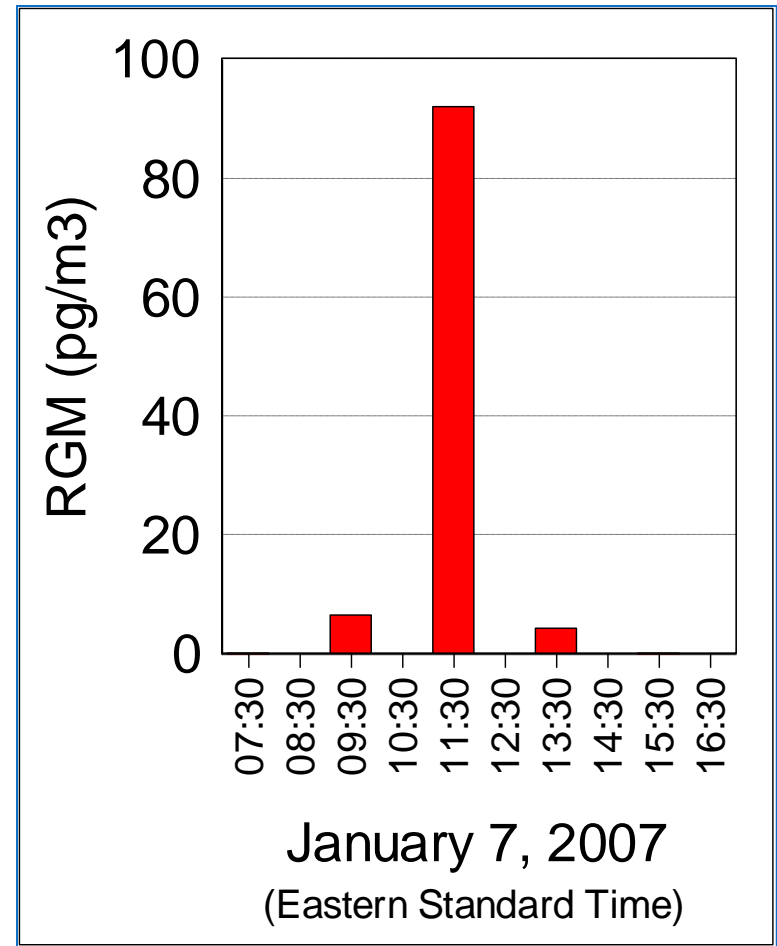
- This is important to know and think about whether or not you do a full scale ensemble analysis
- It's always good to do some “extra” runs where you vary one or more parameters to see how the results change, e.g.,
  - use different met data sets as inputs
  - use different starting heights for back-trajectories
  - use different number of particles for concentration simulations
    - ... keep increasing particle number until results don't change.. you want to find “sweet spot” where you don't have too many so run goes too slow, vs. too few so concentration grid output is too patchy
    - there is no perfect answer that works for all situations... you need to find a good choice for the situation you are modeling... depends on horizontal and vertical concentration grid resolution, met data, distance between source and receptors, ...

# **Some simple, more qualitative approaches to source-attribution**

## Back Trajectory Analysis – Episodes

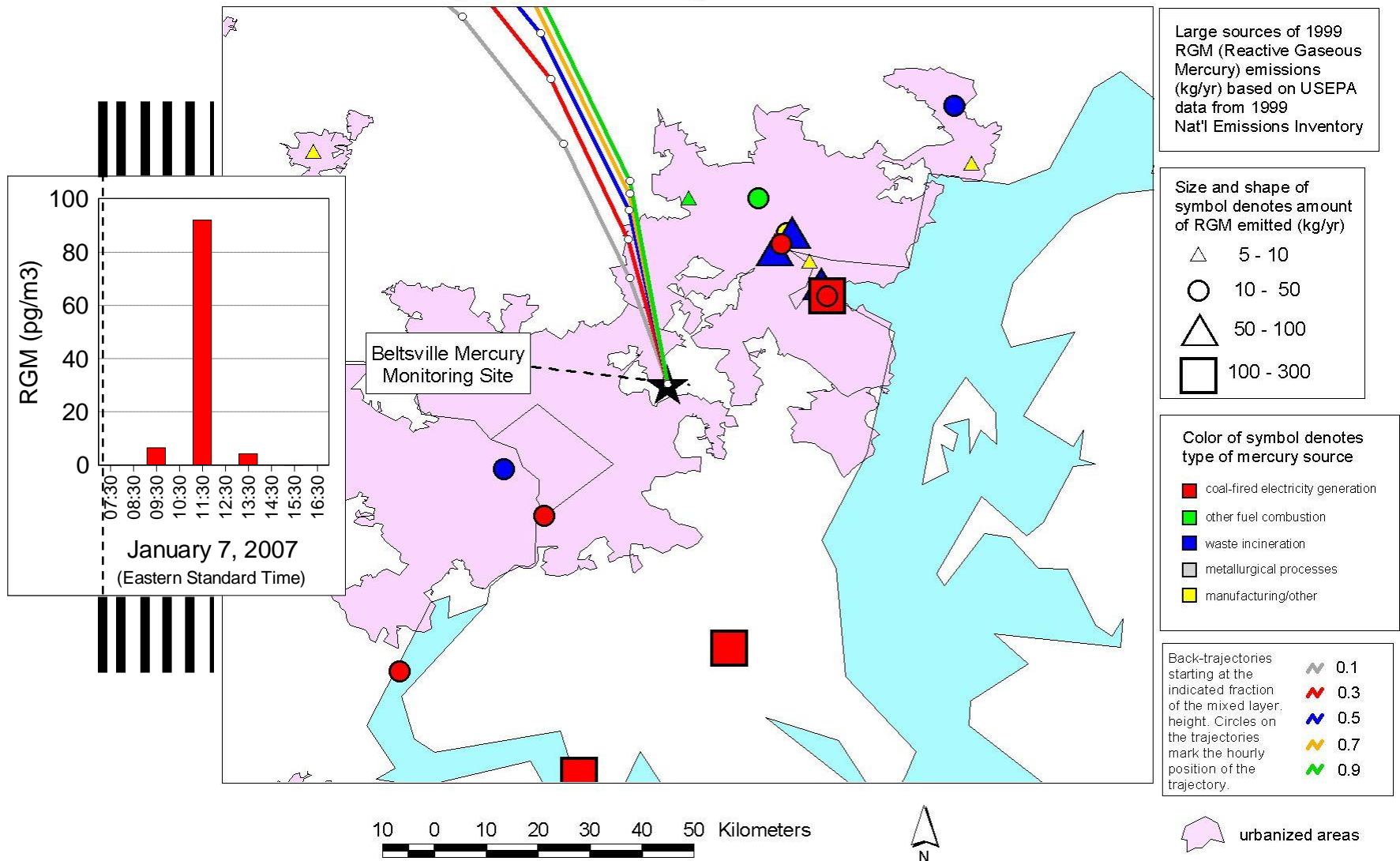


Beltsville, Maryland  
mercury site



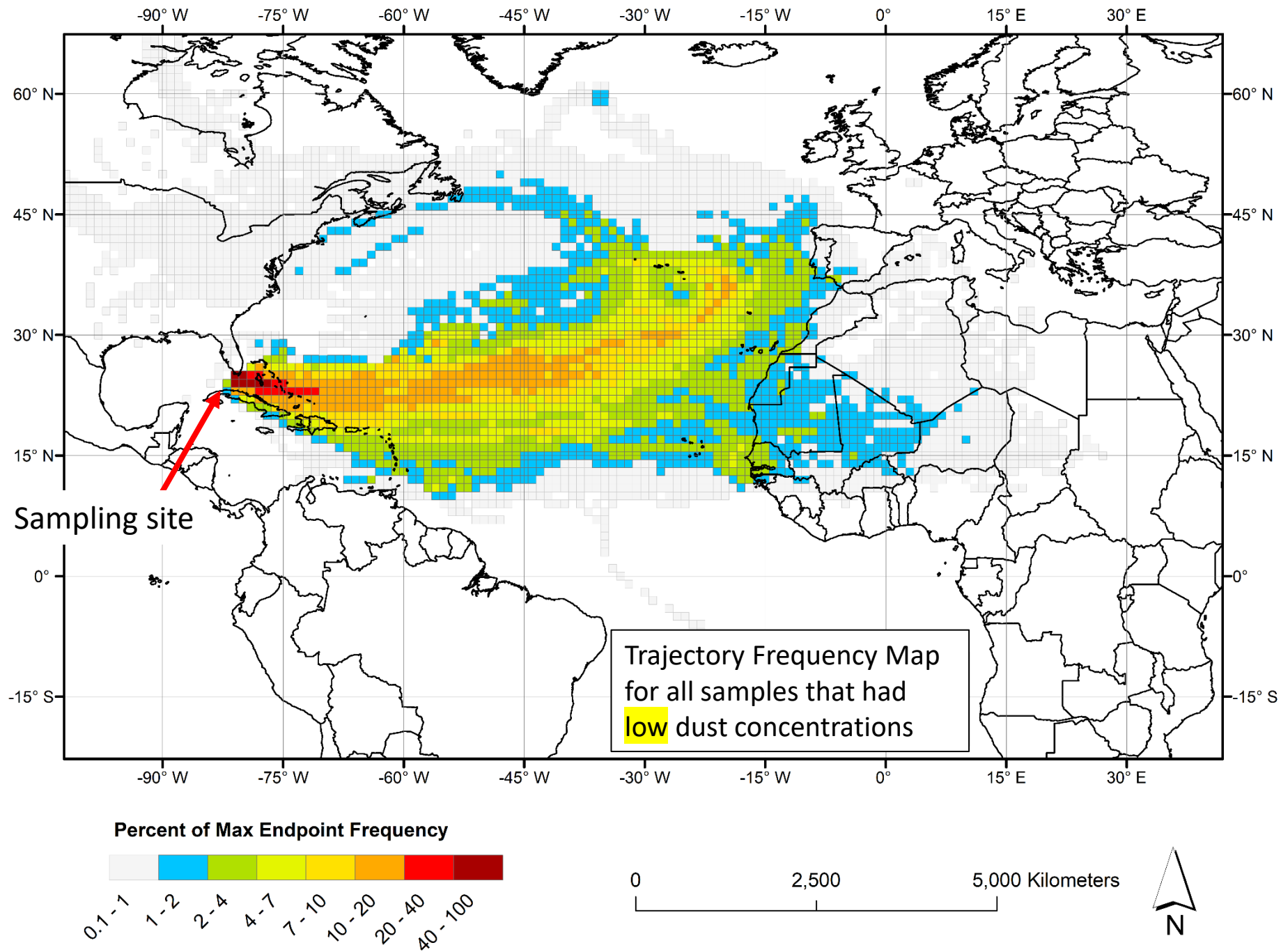
Reactive Gaseous Mercury episode

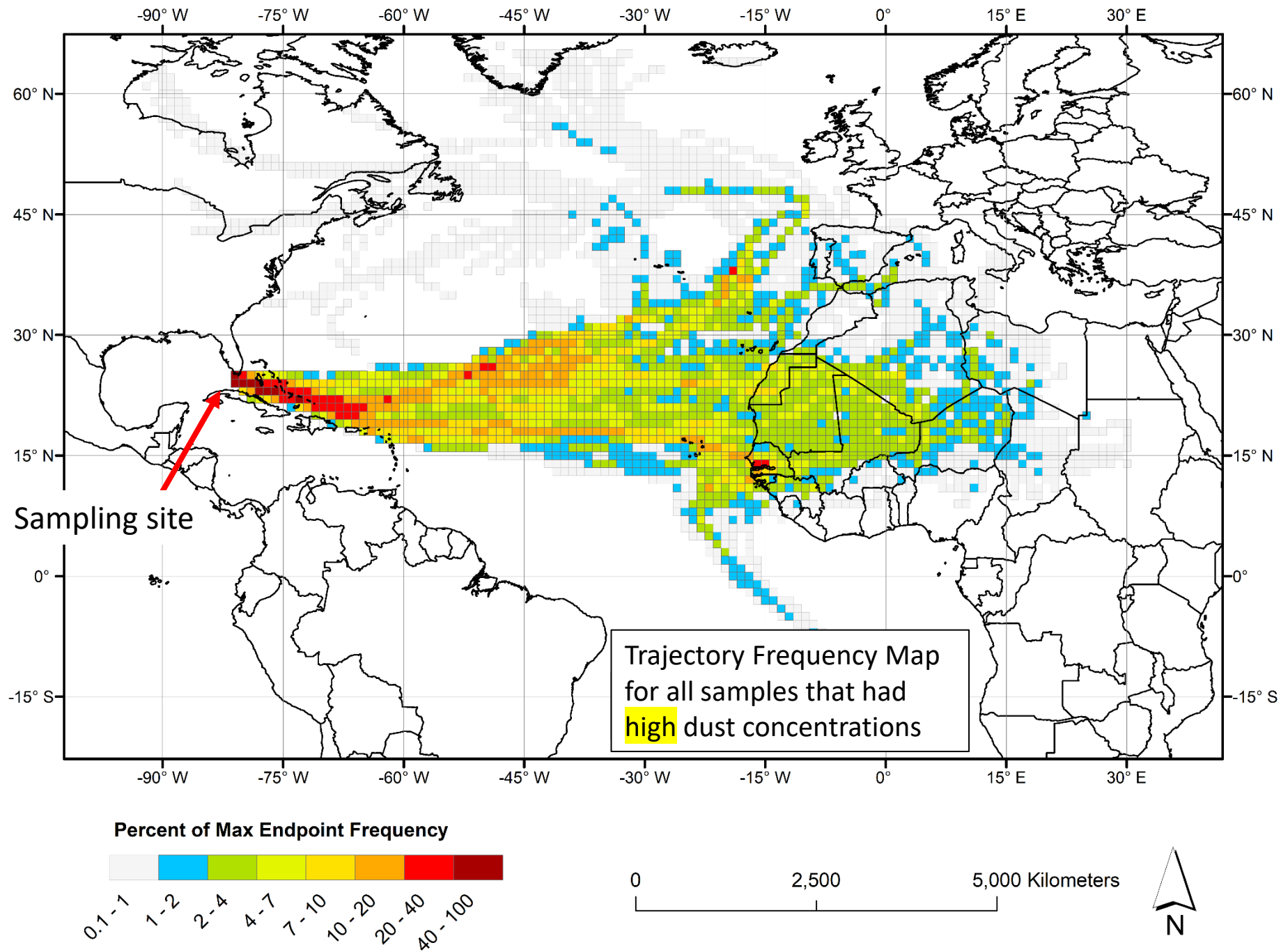
## Back Trajectories Arriving at 1/07/2007 07:00 EST



## A qualitative way to examine source attribution

- Approaches range from relatively qualitative to relatively quantitative
- Suppose you have a series of measurements at a given monitoring site.
- And you run a back trajectory from the site for each measurement. You can do this from the GUI, but you might want to try a script to do this.
  - You can take all of the trajectories associated with high measured values and create a frequency plot (section 6.1 of Tutorial) (you will have to edit the INFILE to make sure it has the correct trajectory endpoint files)
  - You can take all of the trajectories associated with low measured values and create a frequency plot (section 6.1 of Tutorial) (again, editing the INFILE...)
- The difference in geographical patterns between the two maps can tell you something about source attribution
- Note that these were generated by outputting text-file data and importing into ArcGIS (...you can create your own graphics...)





# Agenda – Day 4

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